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Related Lending and Banking Development

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Abstract

Does related lending have positive or negative effects on the development of banking systems? This paper analyzes a unique cross-country data set covering 74 countries from 1990 to 2007, and finds that related lending, on average, does not have any effect on the growth of credit. The authors do find, however, that there are conditional relationships: related lending tends to retard the growth of banking systems when rule of law is weak, while it tends to promote the growth of banking systems when rule of law is strong. They also find that related lending appears to be associated with looting when banks are owned by non-financial firms, but that it does not when non-financial firms are owned by banks. The results indicate that whether related lending is positive or pernicious depends critically on the institutional context in which it takes place; there is no single "best policy" regarding related lending. These findings are robust to alternative specifications, including instrumental variable regressions.

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Related Lending and Banking Development

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1. Introduction

There is a broad consensus that bankers in developing countries engage in related lending. They commonly extend credit to firms owned by their close business associates, members of their own families or clans, or businesses that they own themselves. There is not yet a consensus, however, as to whether this is positive or pernicious. Broadly speaking, there are two competing views.

The first, the looting view, which is informed by recent LDC financial crises and which has come to be the conventional wisdom at multilateral aid organizations, holds that related lending is pernicious. It allows insiders (bank directors) to expropriate outsiders (minority shareholders, depositors, and, when there is under-funded deposit insurance, taxpayers). The incentives for insiders to expropriate the outsiders are particularly strong during an economic crisis, when the insiders have reason to use the resources of the bank to rescue their other enterprises (Akerlof and Romer, 1993; La Porta, López-de-Silanes, Shleifer, and Vishny, 1997, 1998; Rajan and Zingales, 1998b; Johnson, Boone, Breach, and Friedman, 2000; Johnson, La Porta, López-de-Silanes, and Shleifer, 2000; Laeven, 2001; Bae, Kang, and Kim, 2002; Mitton, 2002; Habyarimana, 2003; La Porta, López-de-Silanes, and Zamarripa, 2003).[1] Outsiders, of course, know that they may be expropriated, and therefore behave accordingly: they refrain from investing their wealth in banks, either as shareholders or depositors. The combined effect of tunneling by directors, the resulting instability of the banking system, and the reluctance of outsiders to deploy their wealth in banks is a small banking system.

The second, the information view, which is informed by the economic histories of the United States, Germany, and Japan, is that related lending has a positive effect on the development of banking systems: it allows banks to overcome information asymmetries, and creates mechanisms for bankers to monitor borrowers (Gerschenkron, 1962; Aoki, Patrick, and Sheard, 1994; Lamoreaux, 1994; Calomiris, 1995; Fohlin, 1998). Scholars who stress this view of related lending would wonder why, if related lending is pernicious, it characterized the banking systems of advanced industrial countries during their periods of rapid growth. They

[1] In a crisis, loan repayment by unrelated parties worsens, and thus it becomes more difficult to reimburse depositors and continue operating as a bank. The insiders therefore find it in their interest to make loans to themselves, and then default on those loans in order to save their non-bank enterprises.

would also make the point that related lending is still widespread in those same countries (Kroszner and Strahan, 2001).

Not only do the looting and information views differ from each other in terms of the potential effects of related lending on the development of banking systems, but they also have entirely different policy implications. The looting view can be used to justify stringent regulatory restrictions on cross-ownership between banks and non-financial firms and/or quotas on the amount of loans to related parties so as to reduce the opportunities of bank insiders to expropriate outsiders. The information view of related lending suggests that such regulatory restrictions might be counterproductive: they are likely to diminish the ability of banks to overcome asymmetric information problems.

One reason why the literature has given rise to these two, quite stark, views of related lending is sample selection bias. The fundamental problem is that, as a practical matter, it is only possible to observe related lending directly using ex-post measures—and that ex-post evidence is not randomly distributed across countries or time. Consider, for example, the literature on related lending as looting: the loan books on which these studies are based are available precisely because the banks were intervened by governments in the aftermath of banking crises characterized by tunneling and fraud. Countries in which related lending was positive for the development of the banking system do not figure in these studies: because there was no looting, there was no crisis; because there was no crisis, there was no government intervention; and because there was no intervention, there are no loan books in the public domain. A similar problem affects the literature that views related lending positively—as a mechanism to overcome information asymmetries. It is not an accident that studies that advance this view are all based on historical evidence. The loan books that inform these studies are in the public domain precisely because of the antiquity and durability of the banks. Banks that did not survive for very long, because they were looted by their own directors, were less likely produce loan books that could one day find their way into an archive or library.

The primary goal of this paper is to improve the quality of the causal inferences that may be drawn from the empirical evidence about related lending. In order to do so, we move away from ex-post measures. Instead, equipped with the cross-country data on the restriction on cross-

ownership between banks and non-financial firms, we develop an index of related lending that is based on the ex ante probability that it is occurring. We are able to code this index for 74 countries around the world. Capturing variance across countries allows us to examine the possibility of nonlinearity and move away from the typical "good" or "bad" view of related lending, and investigate whether the institutional environment alters the manner in which related lending retards (or promotes) the development of the banking system. We advance and test the hypotheses that rule of law and depositor monitoring affect the relationship between related lending and the growth of banking systems. We also test the hypothesis that the direction of relatedness matters: when non-financial firms own banks, they are likely to tunnel into the bank in a crisis; but when banks own non-financial firms tunneling during a crisis is less likely.

This inquiry is motivated by several bodies of literature. The first is the rapidly growing and methodologically diverse literature on the finance-growth nexus. A large body of scholarship all points to the same conclusions: financial development exerts an independent, causal effect on growth; and banks are a crucial piece of the overall process of financial development—indeed, they typically dominate securities markets during the early stages of economic development. This work includes historical case studies of developed economies (Sylla 1969, 2007; Neal 1990; de Vries and van der Woude 1997; Rousseau and Wachtel 1998; Rousseau and Sylla 2004); cross-country regressions (King and Levine 1993a, 1993b; Levine and Zervos 1998; Beck, Levine, and Loayza 2000); time series analyses of regions within countries (Jayartne and Strahan 1996; Black and Strahan 2002; Guiso, Sapienza, and Zingales 2004; Dehejia and Lleras-Muney 2007); and time series analysis of industries (Haber 1991; Rajan and Zingales 1998a; Wurgler 2000; Beck and Levine 2002; Fisman and Love 2004; Cetorelli and Strahan 2006; Maurer and Haber 2007). There are, of course, scholars who are not persuaded by this evidence, and, in light of the recent financial crisis, view the growth of credit as pernicious. And indeed, there is some evidence that a positive long-run relationship between financial intermediation and output growth co-exists with a mostly negative short-run relationship (Loayza and Ranciere 2006).We note, however, that the usefulness our inquiry about related lending does not hinge on the existence of a finance-growth nexus. Even if credit expansion has negative consequences for growth, because it contributes to financial crises, the finding that related lending is associated with credit growth is still of relevance to both academics and policy makers.

The second is the literature on institutions and growth. There is now a quite broad body of work that shows that indices of institutional quality (rule of law, property rights, and the like) are strongly correlated with growth (Knack and Keefer, 1995; Kaufmann, Kraay, and Zaido-Lobaton, 1999). A related body of work shows that indices of institutional quality are strongly correlated with the use of external sources of long-term finance by firms (Demirgüç-Kunt and Maksimovic 1998). A growing literature shows that the link between institutions and growth is causal (e.g., Acemoglu, Johnson, and Robinson 2001, 2005).

The third is the literature on depositor monitoring. This literature suggests that generous deposit insurance lessens depositors' incentives to monitor the activities of their banks, resulting in greater banking sector instability and slower banking sector development (Demirgüç-Kunt and Kane, 2002; Demirgüç-Kunt and Detragiache, 2002; Demirgüç-Kunt and Huizinga, 2004).

It follows that related lending is likely to have positive effects on the development of banking systems when strong rule of law protects depositors and minority shareholders from looting by bank insiders and when there are binding constraints on deposit insurance. In point of fact, both features were present in the case that is often cited as strong evidence for the positive view of related lending: New England during the nineteenth century (Lamoreaux 1994). Both features were also noticeably absent in the case that is often cited as strong evidence for the view that related lending is a manifestation of looting: Mexico from 1995 to 1998 (La Porta, López-de-Silanes, and Zamarripa, 2003).

We find three notable empirical results. First, our analysis reveals no clear relationship between regulatory restrictions on related lending and the growth of banking systems; i.e., the average effects of related lending are neither positive nor negative. However, when we allow the effects of related lending to vary with rule of law, we find that related lending has negative effects on the development of banking systems only in countries where rule of law is weak and that it has positive effects where rule of law is strong. These results suggest that when judicial systems are corrupt and public officials can enforce laws and regulations selectively, bank insiders are more likely to be able to expropriate bank outsiders with impunity, resulting in a small banking system. Second, unlike the rule of law, depositor monitoring does not seem to affect the statistical relationship between related lending and the development of banking

systems, suggesting that this monitoring might not be an effective mechanism to curtail potential looting by bankers. Third, the direction of relatedness matters: regulations that allow non-financial companies to own banks appear to create incentives for the owners of those firms to save those firms during an economic crisis by looting their banks; but this effect does not appear to exist when banks own non-financial companies. Taken together, our findings indicate that a negative or positive view of related lending might be too simplistic: the effects of related lending might depend on the institutional environment.

The rest of this paper is organized as follows. In section 2 we describe our data and empirical methods. Section 3 contains the main results. Section 4 decomposes the mechanisms that underpin our main results. Section 5 presents a series of robustness checks. In section 6 we offer concluding remarks.

2. Data and Methods

Our basic empirical strategy is to relate the growth of private credit to regulatory restrictions on related lending, while controlling for macroeconomic factors and institutional features that might also affect credit growth. In order to carry this out, we assemble a data set on credit growth, the extent of related lending, the strength of the rule of law, and the intensity of depositor monitoring for 74 countries from 1990-2007.[2] We then employ this data set to estimate regressions designed to determine whether related lending is, on average, positively or negatively associated with the growth of bank credit, and whether the relationship between related lending and the growth of private credit depends on the strength of rule of law and depositor monitoring. In this section, we first describe how we measure our key variables, and then present our regression model.

2.1 Measurement and Data

A. Financial System Development

Our primary measure of banking system development is the ratio of private credit to GDP, which is a common metric employed in the literature (see Beck, Demirgüç-Kunt, and Levine, 2000; Do and Levchenko, 2007). More formally, for country *i* we compute the average annual rate of growth of the indicator as:

[2] Data for countries that were previously members of the Soviet Union are not available until 1990.

$$Credit\ Growth = \frac{\sum_{t=1}^{T} (Private\ Credit_{it}/GDP_{it}) / (Private\ Credit_{it-1}/GDP_{it-1})}{T} \quad (1)$$

T in our case is 17 since 1991 is the first year for which a growth rate can be computed. *Credit Growth* is used as a dependent variable that captures banking development. The data on private credit is obtained from the World Bank's Financial Structure Database, while GDP is from the IMF's *International Financial Statistics.*

B. Related Lending

Because regulatory authorities in many countries do not require banks to report the percentage of loans made to related parties, and because even those that do have such requirements do not employ uniform definitions of a related party, a key challenge is measuring the extent of related lending across countries. It seems highly likely, however, that related lending is more prevalent in countries where regulators are more tolerant of cross-ownership between banks and non-financial firms and where restrictions on the ownership of bank capital by related parties or a single owner are less binding. Indeed, in nineteenth century New England, which is perhaps the quintessential case of the rapid development of a banking system on the basis of related lending, state regulators were quite tolerant of the fact that the owners of the major industrial firms were also the owners of the banks, and that the ownership of bank stock tended to be highly concentrated among a small group of individuals. Indeed, the banks were essentially the treasury arms of family-run manufacturing companies (Lamoreaux 1994). We therefore construct a proxy for the prevalence of related lending drawing on the database of bank regulation and supervision created by Barth, Caprio, and Levine (hereafter BCL, 2000, 2003).[3] Box 1 reports the questions that underlie our proxy. The first two questions refer to the ownership structure of banks (the maximum share that a single entity or individual may own, and the maximum that a related party may own). The second two refer to the degree to which banks are restricted from owning non-financial firms, and vice versa. Survey responses come from the regulatory and supervisory authorities in each country.

[3]See Barth, Caprio, and Levine (2001) for a description of the database. The survey and data are available at: http://go.worldbank.org/SNUSW978P0.

Box 1. Questions on Relatedness

(from Barth, Caprio, and Levine database of Bank Regulation and Supervision 2000, 2003)

1. What is the maximum percentage of bank capital that can be owned by a single owner [0-100]?
2. What is the maximum percentage of a bank's capital that can be owned by a related party [0-100]?
3. What is the level of regulatory restrictiveness for non-financial firms' ownership of a bank [0 = Prohibited; 33.3 = Restricted; 66.7 =Permitted, with prior authorization or approval; 100=Unrestricted]?
4. What is the level of regulatory restrictiveness for bank ownership of non-financial firms [0 = Prohibited; 33.3 = Restricted to some figure below 100 percent; 66.7 = Permitted to own 100 percent of equity, but ownership is limited based on the bank's equity capital; 100 = Unrestricted, a bank may own 100 percent of the equity of any non-financial firm]?

We rescale the qualitative responses to questions 3 and 4 on ownership inter-linkages with non-financial firms (prohibited, restricted, permitted subject to certain stipulations, and unrestricted) so that they conform to the responses from the first two questions (scaled from 0 to 100). We assign "prohibited" a value of 0, "restricted" a value of 33.3, "permitted" a value of 66.7, and "unrestricted" a value of 100. Our index of related lending, *Related Lending*, is the simple average of the responses to the four questions.[4]

As Box 2 indicates, some of the responses to the questions are significantly correlated, especially questions 1 and 2 (the percentage ownership limits of banks for individual entities and related parties). To a lesser extent, responses to those two questions are also correlated with the responses to question 3 (limits on non-financial firms' ownership of banks). By contrast, the responses to question 4 (limits on bank ownership of non-financial firms) are not significantly correlated with the responses to any of the other questions. Despite some significant correlations, the overall pattern suggests that each question provides a separate source of information. In robustness checks below, we de-compose our index into individual components that isolate the effects of each type of restriction on private credit growth.

[4] The BCL questions in Box 1 were asked in 1998-99 and again in 2002, and thus we have two observations for our index of related lending for each country. We compute the index for each country using the 1998-99 responses and assign that value to all observations prior to 2002. For observations after 2002, we use the responses to the 2002 survey. We then take the average of those two observations for each country (weighted by the number of pre- and post-2002 observations), which we use in the regressions. As a practical matter, there was not much variance in responses from the 1998-99 survey to the 2002 survey. Thus, our results are not sensitive to the weighting scheme.

Box 2. Pairwise Correlations for Components of Related Lending Index				
	Single Owner Limit	Related Party Limit	Non-Financial Firm Ownership of Banks	Bank Ownership of Non-Financial Firms
Single Owner Limit	1 [n=74]			
Related Party Limit	0.758*** [n=74]	1 [n=74]		
Non-Financial Firm Ownership of Banks	0.474*** [n=74]	0.482*** [n=74]	1 [n=74]	
Bank Ownership of Non-Financial Firms	-0.027 [n=74]	0.087 [n=74]	0.079 [n=74]	1 [n=74]

*** indicates p<0.01.

C. Rule of Law

In order to measure the strength of the rule of law we use the index developed by Kaufmann, Kraay, and Zoido-Lobaton (1999, hereafter KKZ). The KKZ data are available for 1996, 1998, 2000, and then annually from 2002 to 2008.[5] We use the index values from 2004 because it is close to coterminous with the 2003 BCL survey, and because it offers wider country coverage than the 2002 survey. We note that our results are not sensitive to the index year chosen, because the KKZ rule of law index does not vary dramatically over time.[6]

D. Depositor Monitoring

We use the level of deposit insurance to measure the intensity of depositor monitoring. More specifically, we compute, for each country *i*, the inverse of the ratio of deposit insurance coverage to per capita GDP:

$$Depositor\ Monitoring_i = \frac{1}{(Coverage\ Limit_i / GDP\ Per\ Capita_i)} \qquad (2)$$

[5] KKZ data set and its description are available at http://www.worldbank.org/wbi/governance/data.html. See Haselmann et al. (2010) on the effects of alternative legal changes on bank lending in transition economies.
[6] The correlation between the 2004 data and those from other years runs from .91 to .98.

The coverage ratios are for 2000, and are taken from (Demirgüç-Kunt and Sobaci, 2001). We use the inverse of the deposit coverage ratios in our index so as to allow this variable to capture potential *positive* effects of depositor monitoring, and to be consistent with our treatment of the other sources of monitoring and enforcement, such as rule of law.[7] We also attempt to capture the difference in the *anticipated* coverage by creating a dummy variable for coinsurance which is found to strengthen the intensity of market monitoring in the literature (e.g., Demirgüç-Kunt and Huizinga, 2004). Coinsurance mechanisms require depositors to bear part of the costs of a banking failure. Our dummy variable equals one if a country has any such arrangement, and zero otherwise.

E. Other Control Variables

We include the initial level of private credit to GDP (i.e., in 1990) in our regressions to control for the possibility that countries with better developed banking sectors tend to experience slower credit growth. These conditional convergence effects were first made known in the context of cross-country growth regressions, but they have also proved important in financial development regressions.[8] We also include the growth rate of GDP per capita and the inflation rate as macroeconomic controls. Both are averaged over the full sample period. We expect private credit growth to be faster in countries with low inflation and high growth, though inflation and private credit growth might be positively related in an expanding economy. The data on macroeconomic controls are from the World Development Indicators database maintained by the World Bank.

Summary statistics for all variables used in the regressions are in Table 1. Correlation coefficients are reported in Table 2. Neither the correlation between credit growth and related lending nor the correlation between our index of depositor monitoring and related lending is significant. Similarly, the correlations between the related lending index and our control variables are also insignificant, except for the negative correlation with GDP growth. We will

[7] One potential issue with the construction of Depositor Monitoring is the treatment of countries without explicit deposit insurance. We assume that the anticipated coverage is not zero and yet small for these countries, and set the value of Depositor Monitoring for those non-deposit insurance countries to the highest value from the countries with explicit insurance (i.e., the lowest coverage limit relative to GDP per capita). However, the implicit insurance can be quite large if government faces a credibility problem without a legally binding coverage limit. In a robustness check, we treat these countries as having the most generous coverage. Our central results turn out to be robust to the treatment of these countries.

[8] Our results are robust to the exclusion of initial private credit (and other macroeconomic controls). These results are not shown to conserve space.

deal with the potential endogeneity of related lending in multiple ways in the section on robustness checks. Before we present our base models, however, we note that the index is not related to measures of credit growth or institutional quality in any straightforward way.

2.2 Regression Model

Our baseline regression is:

$$\textit{Credit Growth}_i = \beta_0 + \beta_1 \textit{Related Lending}_i + \beta_2 \textit{Rule of Law}_i + \beta_3 \textit{Depositor Monitoring}_i + \beta_4 \textit{Coinsurance}_i + \beta_5 \textit{Initital Credit}_i + \beta_6 \textit{Macro Controls}_i + \varepsilon_i \quad (3)$$

where $\textit{Credit Growth}_i$ is the rate of growth in the ratio of credit to the private sector to GDP in country *i* from 1990 to 2007. *Related Lending* is the related lending index, *Rule of Law* is the KKZ rule of law index, *Depositor Monitoring* is the inverse of the insurance coverage-to-GDP per capita ratio, *Coinsurance* is a dummy variable equaling one if a country requires depositors to bear part of the costs of a banking failure, and zero otherwise. *Initial Credit* is the ratio of private credit to GDP in 1990, and *Macro Controls* are the two macroeconomic variables (inflation and GDP growth) described above.

In order to examine whether the effects of related lending depend on the institutional and regulatory environment, we add the interactions between *Related Lending* and other moderating variables (*Rule of Law*, *Depositor Monitoring*, and *Coinsurance*) as follows:

$$\begin{aligned}\textit{Credit Growth}_i = {} & \beta_0 + \beta_1 \textit{Related Lending}_i + \beta_2 \textit{Rule of Law}_i + \beta_3 \textit{Depositor Monitoring}_i \\ & + \beta_4 \textit{Coinsurance}_i + \beta_5 (\textit{Related Lending}_i) * (\textit{Rule of Law}_i) \\ & + \beta_6 (\textit{Related Lending}_i) * (\textit{Depositor Monitoring}_i) + \beta_7 (\textit{Related Lending}_i) * (\textit{Coinsurance}_i) \\ & + \beta_8 \textit{Initital Credit}_i + \beta_9 \textit{Macro Controls}_i + \varepsilon_i \end{aligned} \quad (4)$$

In this specification, positive coefficients for *(Related Lending)*(Rule of Law), (Related Lending)*(Depositor Monitoring)* , and *(Related Lending)*(Coinsurance)* would suggest that rule of law and limitations on deposit insurance coverage enable related lending to have a positive effect on credit growth.

3. Regression Results

The base results appear in Table 3. In the first column, we include only the related lending index and the control variables (initial private credit/GDP, inflation and real GDP growth). The coefficient for *Related Lending* is insignificant indicating that on average related lending is not strongly associated with private credit growth. Even when we add *Rule of Law* to the regressions in column 2, thus providing some institutional context, the coefficient on *Related Lending* remains insignificant. Rule of law enters the regression with the expected sign and significance. These results suggest that, on average, rule of law is a powerful determinant of banking development while related lending does not seem to be important.

When we introduce the interaction between *Rule of Law* and *Related Lending* in specification 3, however, we do find strong evidence of nonlinearity. The negative coefficient for (un-interacted) *Related Lending* and the positive coefficient for the interaction of Related Lending with Rule of Law indicate that the impact of related lending is negative when rule of law is weak and yet, turns positive when rule of law is sufficiently strong. In particular, based on the coefficient estimates of specification 3, related lending is positively associated with private credit growth for countries that score above 5.46 on the Rule of Law index.[9] This critical value is just below the 60th percentile value of the *Rule of Law* index, suggesting that the positive effects of related lending are likely only in a relatively small group of countries with good institutions, mostly OECD countries.

This result also suggests that although the pernicious effects of related lending are evident only for countries with weak rule of law, the effect is quantitatively important for this group of countries. Consider an experiment in which the *Related Lending* index rises by one standard deviation for countries at the 25th percentile in terms of *Rule of Law* index (4.45).[10] According to the results in specification 3 in Table 3, such an increase in permissiveness of related lending is associated with a 1.5 percentage point decline in the annual growth rate of

[9] For reference, the countries with scores closest to 5.46 are Malaysia (5.52) and Costa Rica (5.57).
[10] For reference, the countries with scores closest to 4.45 are Bolivia (4.45) and Honduras (4.39).

private credit/GDP, not a trivial change since the average annual growth in private credit/GDP across our entire sample is 3.3 percent (Table 1).[11]

Similarly, the positive coefficient on the interaction between related lending and rule of law suggests evidence of nonlinearity in the effects of rule of law. The point estimates in specification 3 suggest that the effect of an improvement in the rule of law is to increase private credit for virtually all countries, which is consistent with the result of specification 2,[12] but this positive effect is even more powerful when bank regulations permit related lending.[13]

Specifications 4-8 of Table 3 include *Depositor Monitoring.* Whether *Depositor Monitoring* appears alone (models 4 and 6) or is interacted with our index of related lending (models 5 and 7), it is only significantly associated with private credit growth in one model (5), and then only at the 10 percent level. The results (or non-results) are not due to the absence of control for *Rule of Law.* We include it (specifications 6 and 7), and then interact it with related lending (specification 8)—and obtain the same results. These results are also robust to incorporating an additional measure of deposit insurance, namely the dummy variable for coinsurance, which we interact with related lending (specification 9). Taken as a group, specifications 4-9 indicate that depositors might not be effective monitors of looting by bank insiders. Nevertheless, related lending tends to promote credit growth in countries with strong rule of law even when we control for *Depositor Monitoring* (Specifications 6, 7, and 9). When

[11] John, Saunders, and Senbet (2000) advance a theory in which corporate boards can craft management contracts so as to promote first-best value-maximizing investment choices by the bank. The implication is that our results might be biased, because one would think that such strong institutions of corporate governance might be more prevalent in environments in which the rule of law is weak. It is not possible, unfortunately, to operationalize their theoretical framework cross-nationally. There are indices that capture the power of minority shareholders to police corporate boards (e.g., La Porta, et. a., 1998), but there are not comparable cross-national indices that capture the ability of boards to control management. We note, however, that this potential source of bias works against our hypothesis: if weak rule of law is mitigated by institutions that allow boards to control management, then our regressions are underestimating the effect of related lending on credit growth in weak rule of law environments.

[12] To be more specific, the coefficients for model 3 imply that only for countries with related lending scores below 20 would the relationship between rule of law and private credit growth be negative. No country in the dataset has a related lending score below 19. For the lone negative value, corresponding to the country with a related lending score of 19 (Thailand), we cannot reject the hypothesis that rule of law has no effect on private credit growth. For all those above 35 (62 of 74 countries) the model implies a positive, significant relationship between rule of law and private credit growth at the 5% error level.

[13] For interested readers, we tabulated the effects of related lending on private credit growth conditional on the 25th, 50th, and 75th percentile level of rule of law and the effects of rule of law conditional on the 25th, 50th, and 75th percentile level of related lending in Appendix 1.

rule of law is weak but related lending is permitted, however, private credit grows more slowly than in countries that do not permit related lending.[14]

4. Probing for Mechanisms

Thus far, we have shown that the effects of related lending are highly heterogeneous, depending crucially on institutional quality. In this section, we search for mechanisms, in order to provide more specifics about the policies, institutions, and contexts that increase the likelihood that related lending makes a positive contribution to the development of banking systems.

The theoretical literature on looting suggests that the incentives for insiders to expropriate outsiders are particularly strong during an economic crisis. In a crisis, bank insiders find it more difficult to reimburse depositors and continue operating as a bank, and as a result, the insiders find it in their interest to make loans to themselves, and then default on those loans in order to save their non-bank enterprises (e.g., Akerlof and Romer, 1993, La Porta, López-de-Silanes, and Zamarripa, 2003). Hence, theory suggests another dimension of nonlinearity. That is, the pernicious effects of related lending are likely to be most pronounced for countries that permit non-financial firms to own banks, while ownership of non-financial firms by banks is less relevant.[15] Moreover, these differential effects should be quantitatively more important during a crisis.

To test these hypotheses, we de-compose our index to examine which specific group of actors is driving our main findings. To be specific, we use the answer to question 3 from Box 1 on whether banks are restricted from owning non-financial firms as our measure of related lending in Table 4, Model 1. In Model 2, we use question 4 on whether non-financial firms are restricted from owning banks.

[14] To conserve space in Table 3, we do not show all possible model permutations. For example, the co-insurance variable does not appear in the simple models on the left hand side of the table that do not incorporate interaction terms, and model 7 doesn't include all possible interactions between rule of law, monitoring by depositors, and related lending (because it leaves out rule of law*depositor monitoring). We have however run models with all possible permutations of the interaction terms using the related lending, rule of law, depositor monitoring, and coinsurance variables (available from the authors). Our main results for related lending and the interaction between related lending and rule of law hold in all of those specifications.

[15] In fact, a banker who owns a downstream firm might be inclined to loot it to save his bank.

Bank ownership of firms has no significant association with credit growth, nor does its interaction with the rule of law. By contrast, firm ownership of banks is negatively associated with private credit growth, while its interaction with rule of law is positive. The magnitude of these two coefficients implies that for countries with the highest scores for rule of law, related firm ownership of banks has no significant effect on credit growth. For all others, the effects are negative. These results suggest that non-financial firms are more likely to loot their banks than other types of bank owners when the rule of law is weak.

In columns 3 and 4, we use single and related party ownership limits as our proxies for the permissiveness of related lending. Coefficients for both variables are negative and significant, while their interactions with rule of law are positive and highly significant. The pattern suggests that in countries where rule of law is strong, less stringent limits on single and related party ownership of banks contribute to more rapid growth in private credit.

Model 5 presents the results for a sub-sample of countries that experienced a banking crisis during the 1990s, which we identify from Caprio and Klingebiel (2003). Model 6 presents the results for a sub-sample of countries that did not have a banking crisis. The firm ownership of banks variable and its interaction with the rule of law are both significant and of the expected signs for crisis countries (Model 5). Neither is significant for non-crisis countries (Model 6).[16] These results suggest that the pernicious effects of related lending are caused by a combination of three factors: weak rule of law; regulations that allow non-financial companies to own banks; and an economic crisis that creates incentives for the owners of the non-financial firms to save those enterprises by looting their banks.

5. Robustness Checks

In this section, we address potential econometric concerns, and also demonstrate the robustness of our main result and offer additional evidence that the relationship that we have found is a causal one.

[16] We note that the stark differences in results for crisis and non-crisis countries for the firm ownership of banks variable are not evident for either the single or related party ownership variables.

5.1 Replacing Rule of Law with More Exogenous Proxies

The first concern is that institutional quality might be endogenous to unobservable political factors that affect credit growth; e.g., governments that are captured by incumbent business interests might deliberately block institutional reform to keep the financial system from developing. To address this concern, we replace our measure of institutional quality – the rule of law – with variables that capture fundamental exogenous factors that drive institutional outcomes. Work by Easterly, Ritzen, and Woolcock (2006) shows that ethnic fractionalization undermines social cohesion, which undermines the rule of law, which in turn affects economic growth.[17] Obviously, any institutional measure is going to contain some component that is endogenous to politics and political institutions. One would be hard pressed, however, to argue that ethnic fractionalization is caused by political factors.

We therefore substitute ethnic fractionalization for the rule of law variable in Table 5, models 1 and 2. Related lending is positive and significant in both specifications, while related lending interacted with ethnic fractionalization is negative and significant. The regressions indicate that at low levels of social cohesion, the impact of related lending on credit growth is negative, but that at high levels of social cohesion related lending has a positive impact on credit growth.[18] These findings are therefore consistent with those we obtained from the rule of law regressions. They also provide additional information about the type of society in which related lending is less likely to offer benefits.

[17] They also show that these measures of social cohesion pass over-identification tests for excludability in growth regressions.

[18] The measure of ethnic fractionalization used by Easterly *et al*. ranges from 0 to 1 with higher values indicating more fractionalization. In our sample, the mean value is 0.44 and the highest value is 0.93 for Uganda. The lowest values are for Japan (.01) and Korea (.002). One might interpret the positive coefficient for ethnic fractionalization as indicating that at low levels of related lending fractionalization has a positive effect on private credit growth. However, that coefficient can be explained in the context of the values for related lending in our sample and its size relative to the coefficient on the interaction term. At the lowest levels of related lending in our sample, fractionalization is positively associated with private credit growth, but the relationship is never significantly different from zero, and thus we cannot reject the hypothesis that there is no relationship between fractionalization and private credit growth for those countries. At higher levels of related lending, the relationship is negative and becomes significant for related lending values near 50. So, for about a quarter of the sample we find no significant relationship for fractionalization. For the remaining three-quarters we find a negative, significant relationship, as one would expect.

5.2 An Instrument for Related Lending

Though ethnic fractionalization poses fewer endogeneity problems than rule of law, the substitution of these variables does not address the potential endogeneity of the related lending policies themselves, which could also be driven by similar unobservable political factors. The difficulty, of course, is finding an appropriate instrument for those policies.[19] We propose as a candidate the index of official supervisory powers constructed by BCL (2001). That index, which is described in detail in Appendix 2, is based on sixteen questions about the powers granted to supervisors in monitoring and disciplining banks. We view this as an indication of a society's general propensity to use official mechanisms to monitor market activities. To the extent that a society views its banking sector as being tightly regulated and supervised, fears about the negative effects of related lending might be diminished. We would therefore expect a positive relationship between our related lending index and the BCL index of official supervisory powers, and indeed the correlation between the two is 0.42, which is significant at the 1 percent level.

When we use the official supervisory powers index as an instrumental variable in a two-stage least squares regression, the index of related lending is not statistically significant at conventional levels (Table 5, column 3). When we then restrict the sample to countries that began our period of study with relatively low levels of credit (private credit/GDP < 0.7 in 1990), the index of related lending is negative and significant at the 5 percent level (column 4). This filter excludes nine countries from the active observation set, eight of which are industrialized.[20] Similar results hold when we restrict the sample using other variables that measure institutional or financial development. The results from the instrumental variable regressions therefore indicate that related lending is more strongly associated with slower private credit growth in less developed countries, which offers support for the notion that the relationships that we uncovered in our baseline regressions are causal.

[19] Ethnic fractionalization is not a good instrument because we have no strong prediction about the relationship between it and our index of the permissiveness of related lending. Indeed, the significant results in models 1 and 2 of Table 4 derive from the fact that related lending is permitted in some highly fractionalized societies and in some homogeneous societies. The correlation between ethnic fractionalization and the related lending index is 0.15 and not significant at the p=.10 level; i.e., ethnic fragmentation would not be a strong instrument for related lending even if it is exogenous.

[20] Those industrialized countries are Switzerland, France, Japan, Malta, Netherlands, New Zealand, Singapore, and the United Kingdom.

5.3 Unobserved Heterogeneity

A skeptical reader might be inclined to think that our regressions might be picking up the effect of some unobserved variable that jointly determines the growth of credit and the laws governing related lending. Such a reader might point to either of two types of unobserved variables that could be driving our results: those that proxy for a generalized financial boom; and those that proxy for a weak institutional environment.

We address these concerns about unobserved heterogeneity in Table 6. Models 2, 3, and 4 add controls in a stepwise fashion to address the hypothesis that a generalized financial boom, rooted in the capital markets, is driving our results: Model 2 controls for the rate of growth of the capitalization of the stock market; Model 3 controls for the rate of growth of the ratio of the capitalization of the stock market to GDP; and Model 4 controls for the degree to which the capital market is liberalized, using the Chinn-Ito Index of Capital Market Openness. None of the three control variables enters the regressions as statistically significant, nor does their inclusion affect the sign or statistical significance of the coefficients on related lending and the rule of law interacted with related lending (see Model 1 for the base results). Models 5 and 6 control for the possibility of a generalized boom in the banking sector, by adding a variable for the rate of growth of the ratio of bank deposits to GDP (Model 5) and for the rate of growth of the ratio of bank credit to bank deposits (Model 6). Both of these variables enter the regressions with the expected sign and significance (indeed, it would be very odd to find that credit growth was not associated with deposit growth), but neither affects the sign, magnitude, or statistical significance of the variables of interest in our base results.[21] Models 7, 8, 9, and 10 address concerns about a weak institutional environment driving our results, by adding controls for government ownership of banks (following La Porta et. al 2002), corruption, property rights protection, and financial freedom in a stepwise fashion. None of these controls enter as statistically significant, nor do they have a material effect on the variables of interest in our base regression: the related lending index remains negative and highly significant, while the rule of law interacted with related lending remains positive and highly significant. In short, it does not appear that our results—that

[21] To make sure that rapid growth in credit in the run-up to the recent crisis is not driving our main findings, we also estimated models for the period 1990 to 2000 and 1990 to 2004. Our main findings for related lending and its interaction with rule of law also hold in those models.

related lending has positive effects on the development of the banking sector when there is strong rule of law—are a statistical artifact.

5.4 A Direct Channel between Related Lending and Non-Bank Forms of Finance

A particularly skeptical reader might want to argue that we have picked up a real effect, but have mis-specified the chain of causality: related lending allows the capital markets to grow faster than otherwise when rule of law is strong; bank credit is expanding as a second-order effect.

We address this hypothesis in Table 7. We switch the dependent variable, from the growth of credit to: the rate of growth of the ratio of the stock market capitalization to GDP (Model 1); the rate of growth of the ratio of the total value traded on the stock market to GDP (Model 2); and the rate of growth of total liquid liabilities to GDP (Model 3). The results indicate that we have not mis-specified the chain of causality: the coefficients for related lending, as well as for related lending interacted with rule of law are far from statistical significance in all three models. The implication is clear: related lending affects financial development by working through bank credit.

5.5 Split Sample Tests

When conditional effects emerge from interaction terms, one wants to be sure that the result is not caused by outlying cases at either end of the tail. We therefore employ split sample techniques as a robustness test, and present the results in Table 8. We divide the dataset into three sub-samples based on the rule of law, and estimate separate regressions, without the interaction term, on each sub-sample. Models 1 and 2 are estimated on the bottom third of the sample. Models 3 and 4 are estimated on the middle third of the sample. Models 5 and 6 are estimated on the upper third of the sample. We estimate each model twice: first with related lending alone, and then with related lending and the rule of law. All of the models produce coefficients that are consistent with our base result: related lending is negatively and significantly linked to private credit in the bottom third of the sample; there is a positive, but not significant, relationship in the middle third; and there is a positive and significant relationship in the upper third.

5.6 Look Ahead Bias

One final concern is ahead bias. The rules about related lending from BCL that we use to construct our index are from 1998-1999 and 2002. However, our measure of private credit growth starts in 1991, which means that we have some countries in the data set that had financial crises before 1998-1999, and that might have changed their related lending rules as a result of those crises. Since we lack systematic information about which countries changed their related lending policies in the wake of a banking crisis, we carry out two separate tests to rule out this possibility. First, we directly control for the occurrence of a banking crisis. If banking crises that occurred in the 1990s are driving the correlation between credit growth and our related lending index, our main results should disappear or weaken dramatically. The results show that our central results are robust to adding a crisis control (Table 9).[22]

In addition, in order to be sure that our results are robust, we truncate our dataset to the period since 1998, re-estimate the regressions, and present the results in Table 10. We note that this procedure implies a quite stringent test: not only is the window of time quite short (we are measuring the rate of growth of credit over only ten years), but this particular period is known for the absence of the kinds of banking crises that are predicted to cause looting via related lending. Indeed, the period is often referred to as the great moderation.

The stringent nature of the test does affect our results, but not in a decisive way. Model 1 indicates that related lending has neither positive nor negative effects on its own, and that there is a strong, positive correlation between the rule of law and credit growth. These are the same qualitative results we obtain in our base regression (Table 3). When we interact related lending and rule of law in Model 2, we obtain results with the same signs as in Table 3, but they are not statistically significant. In order to examine robustness, we therefore recode the rule of law variable as a dummy (countries that have a rule of law score in the 66^{th} percentile and above =1), and re-estimate the regressions. We report the results in Model 3, and find that related lending is associated with faster credit growth in countries with very strong rule of law. In order to make sure that this result is robust, we then follow the same procedure we applied in Table 8: we split the sample into thirds based on rule of law scores at the beginning of the period (1998); and then

[22] In addition, the correlation between the related lending index and the indicator of financial crisis turns out to be weak (-0.22), suggesting that look ahead bias is unlikely to be driving our key results.

re-estimate the regressions on each of the three sub-samples. We obtain results that are qualitatively similar: related lending is negatively associated with private credit growth in the bottom third of the sample; there is a positive, but not significant, relationship in the middle third of the sample; and there is a positive and significant relationship in the upper third of the sample.

6. Conclusions

We find that there are institutional conditions under which related lending is negative for private credit growth, and conditions under which it is positive for private credit growth. In particular, when the rule of law is strong, related lending is associated with faster credit growth. We suggest that this result holds because fear of legal sanction keeps bank insiders from looting their own banks. At the same time, the banking system benefits from the positive features of related lending, such as the ability to overcome information asymmetries and monitor borrowers at low cost. When rule of law is weak, however, related lending is associated with slower credit growth, presumably because bank insiders can loot their own banks with impunity.

Unfortunately for policy makers in developing countries, the institution building associated with firmly establishing the rule of law is a long-term process. Moreover, we find no readily available substitutes for rule of law in preventing the abuses associated with related lending. For example, we hypothesized that the institution of depositor monitoring might also play a role in determining the effects of related lending. However, we did not detect any relationship between related lending and private credit growth in the countries where depositors have strong incentives to monitor banks. We speculate that depositor monitoring is too blunt an instrument to detect when related lending is being used in ways that hurt banks.

This leaves policy makers in developing countries in a quandary: How can they tailor related lending policies so that they promote financial development when establishing the rule of law is a long-term proposition and depositors cannot detect abuses associated with insider lending? It is little wonder, therefore, that international financial institutions such as the IMF and the World Bank tend to discourage related lending in their client countries.

At the same time, however, our robustness checks offer clues about situations in which related lending is most likely to lead to abuses by insiders, and those clues could offer some

guidance to policy makers. For example, related lending appears most likely to lead to abuses in highly fractionalized societies. It also appears that ownership of banks by non-financial firms poses a greater threat of looting than ownership of non-financial firms by banks, and that this threat is most pronounced in times of systemic crisis. Finally, expanding the official powers of bank supervisors does not appear to root out related lending abuses, especially in less developed countries.

Taken as a group, our results indicate that there is no single "best policy" regarding related lending. Whether or not policy makers should deter bankers from extending credit to themselves and their business associates crucially depends on how well they can adapt those policies to their specific country context.

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Table 1. Summary Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Private credit / GDP growth, 1990-2007	74	103.330	4.115	86.142	112.950
Related lending index	74	64.951	22.573	19	100
Rule of law	74	5.283	1.020	3.5	7.01
Monitoring by depositors	67	1.447	1.172	0.04	2.71
Initial private credit / GDP	74	0.385	0.327	0.032	1.561
Inflation, 1990-2007	74	9.754	15.538	0.529	107.692
GDP growth rate, 1990-2007	74	3.759	1.546	0.253	7.224
Ethnic fractionalization	74	0.416	0.273	0.002	0.879
Official supervisory power	70	10.786	2.797	4	14

Table 2. Pairwise Correlation Matrix of Variables

	Private credit/GDP growth, 1990-2007	Related lending index	Rule of law	Monitoring by depositors	Initial private credit/GDP	Inflation, 1990-2007	GDP growth, 1990-2007
Private credit/GDP growth, 1990-2007	1						
	74						
Related lending index	-0.1018	1					
	0.3879						
	74	74					
Rule of law	0.2897	0.0133	1				
	0.0123	0.9103					
	74	74	74				
Monitoring by depositors	0.067	0.1787	-0.1187	1			
	0.59	0.1479	0.3385				
	67	67	67	67			
Initial private credit/GDP	-0.1416	0.1116	0.7078	-0.1967	1		
	0.2288	0.344	0	0.1106			
	74	74	74	67	74		
Inflation, 1990-2007	0.0518	0.0936	-0.2469	-0.1076	-0.1302	1	
	0.661	0.4278	0.0339	0.386	0.2687		
	74	74	74	67	74	74	
GDP growth rate, 1990-2007	0.182	-0.236	-0.0077	0.1923	-0.1892	-0.209	1
	0.1206	0.043	0.9481	0.119	0.1065	0.0739	
	74	74	74	67	74	74	74

Notes. For each variable listed in the table, the first line is the correlation coefficient, the second is its p-value, and the third is the number of observations used in calculating that coefficient.

Table 3: Base Results

T-statistics are in parentheses. *, **, and *** represent statistical significance at the 10%, 5%, and 1% level respectively. All models estimated via ordinary least squares.
Dependent variable is the average growth rate of private credit / GDP from 1990 to 2007, obtained from the World Bank's Financial Structure Database. The related lending index is the average of responses to four questions on related lending from the database of bank regulation and supervision created by Barth, Caprio and Levine (2000, 2003). Rule of law comes from the index developed by Kaufmann, Kraay, and Zoido-Lobaton. Deposit monitoring is measured as the inverse of the ratio of deposit insurance coverage per capita GDP. The coinsurance variable is a dummy equal to one if depositors are required to bear some of the costs of banking failures and zero otherwise.

Dependent variable: Private credit/GDP growth, 1990-2007	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Related Lending Index	-0.0109	-0.00611	-0.370***	0.000982	0.0350	-0.342***	-0.310***	-0.00202	-0.206
	(-0.525)	(-0.340)	(-3.209)	(0.0495)	(1.292)	(-3.611)	(-3.262)	(-0.110)	(-1.407)
Rule of Law		3.275***	-1.318			-1.061	-0.936	2.616***	-0.861
		(4.952)	(-1.141)			(-1.074)	(-0.968)	(3.151)	(-0.843)
Related Lending x Rule of Law			0.0678***			0.0623***	0.0600***		0.0536***
			(3.428)			(3.909)	(3.890)		(3.274)
Monitoring by Depositors				0.0632	1.516*	0.0577	0.892	-1.197	5.350
				(0.170)	(1.683)	(0.181)	(1.129)	(-0.576)	(1.278)
Monitoring by Depositors x Related Lending					-0.0239		-0.0137		-0.0413
					(-1.442)		(-1.012)		(-0.755)
Monitoring by Depositors x Rule of Law								0.257	
								(0.644)	
Coinsurance									11.27
									(1.084)
Coinsurance x Related Lending									-0.0700
									(-0.519)
Initial Private Credit/GDP	-1.169	-8.437***	-9.077***	-1.916	-1.862	-9.374***	-9.275***	-8.787***	-9.688***
	(-0.851)	(-5.628)	(-6.696)	(-1.448)	(-1.376)	(-5.831)	(-5.642)	(-4.806)	(-6.660)
Inflation, 1990-2007	0.0213	0.0496**	0.0518**	0.00647	0.00333	0.0463***	0.0440**	0.0332*	0.0475**
	(1.039)	(2.327)	(2.646)	(0.330)	(0.163)	(2.775)	(2.466)	(1.899)	(2.532)
GDP Growth Rate, 1990-2007	0.445	0.247	0.323	0.216	0.334	0.235	0.297	-0.00721	0.373
	(1.212)	(0.752)	(1.247)	(0.563)	(0.859)	(0.890)	(1.064)	(-0.0205)	(1.337)
Constant	102.6***	88.26***	112.9***	103.4***	101.0***	112.0***	110.0***	92.73***	97.30***
	(50.82)	(22.53)	(16.58)	(46.50)	(39.40)	(18.50)	(18.06)	(20.07)	(8.620)
Observations	74	74	74	67	67	67	67	67	67
R-squared	0.054	0.360	0.480	0.045	0.069	0.470	0.478	0.363	0.514

Table 4. De-Composition of Related Lending Index

T-statistics are in parentheses. *, **, and *** represent statistical significance at the 10%, 5%, and 1% level respectively. All models estimated via ordinary least squares.
Dependent variable is the average growth rate of private credit / GDP from 1990 to 2007, obtained from the World Bank's Financial Structure Database. The related lending index is the average of responses to four questions on related lending drawing on the database of bank regulation and supervision created by Barth, Caprio and Levine (2000, 2003), Rule of law comes from the index developed by Kaufmann, Kraay, and Zoido-Lobaton. Deposit monitoring is measured as the inverse of the ratio of deposit insurance coverage per capita GDP. Restrictions on ownership variables are from the four components that comprise the related lending index (Box 1). Each component is equal to 0 if ownership is prohibited, 33.3 if restricted, 66.7 if permitted, or 100 if unrestricted.

Dependent variable:					Crisis	Non-Crisis
Private credit/GDP growth, 1990-2007	(1)	(2)	(3)	(4)	(5)	(6)
Monitoring by Depositors	0.102	-0.0253	0.0297	0.112		
	(0.315)	(-0.0789)	(0.0934)	(0.357)		
Initial Private Credit/GDP	-8.662***	-9.408***	-9.194***	-8.810***	-9.113***	-8.642***
	(-4.665)	(-5.123)	(-5.741)	(-5.595)	(-5.335)	(-4.655)
Inflation, 1990-2007	0.0348*	0.0363**	0.0431**	0.0487***	0.0500***	0.0473
	(1.851)	(2.559)	(2.326)	(2.712)	(3.872)	(0.888)
GDP Growth Rate, 1990-2007	0.0380	0.218	0.207	0.196	0.253	0.412
	(0.112)	(0.805)	(0.844)	(0.607)	(0.988)	(1.106)
Rule of Law	3.489***	0.0707	0.584	0.411	-1.659	1.485
	(3.165)	(0.0652)	(0.883)	(0.627)	(-1.306)	(0.844)
Restrictions on banks' ownership of firms	0.0561					
	(0.567)					
Restrictions on banks' ownership of firms	-0.0102					
x Rule of Law	(-0.575)					
Restrictions on firms' ownership of banks		-0.256**			-0.353**	-0.181
		(-2.589)			(-2.778)	(-1.072)
Restrictions on firms' ownership of banks		0.0472***			0.0621**	0.0331
x Rule of Law		(2.701)			(2.709)	(1.147)
Restrictions on ownership by single party			-0.176***			
			(-3.525)			
Restrictions on ownership by single party			0.0335***			
x Rule of Law			(3.902)			
Restrictions on ownership by related parties				-0.192***		
				(-3.671)		
Restrictions on ownership by related parties				0.0352***		
x Rule of Law				(4.065)		
Constant	87.75***	105.9***	102.6***	103.7***	115.1***	97.23***
	(16.31)	(16.32)	(25.36)	(24.68)	(15.69)	(9.016)
Observations	67	67	67	67	22	52
R-squared	0.362	0.434	0.465	0.466	0.657	0.407

Table 5. Addressing Endogeneity Issues

T-statistics are in parentheses. *, **, and *** represent statistical significance at the 10%, 5%, and 1% level respectively. Models 1 and 2 estimated via ordinary least squares; models 3 and 4 estimated using instrumental variables regressions.
Dependent variable is the average growth rate of private credit / GDP from 1990 to 2007, obtained from the World Bank's Financial Structure Database. The related lending index is the average of responses to four questions on related lending drawing on the database of bank regulation and supervision created by Barth, Caprio and Levine (2000, 2003), and was instrumented with an index of official supervisory powers in columns (3) and (4). In column 4, the sample is restricted to countries that had low initial levels of banking sector development as reflected in a ration of Private Credit/GDP below 0.70. Rule of law comes from the index developed by Kaufmann, Kraay, and Zoido-Lobaton. Deposit monitoring is measured as the inverse of the ratio of deposit insurance coverage per capita GDP. Ethnic fractionalization measures the probability that two random individuals from a given country will not belong to the same ethnolinguistic group (Mauro 1995).

Dependent variable:				
Private credit/GDP growth, 1990-2007	(1)	(2)	(3)	(4)
	OLS	OLS	IV	IV
			Full sample	Private Credit/GDP <0.70 in 1990
Related Lending Index	0.0790***	0.0732**	-0.211	-0.194**
	(2.772)	(2.455)	(-1.530)	(-2.181)
Monitoring by Depositors		0.402	1.026	0.455
		(1.035)	(1.279)	(0.811)
Initial Private Credit/GDP	-3.315**	-3.016*	-7.431**	-17.65***
	(-2.133)	(-1.924)	(-2.219)	(-3.519)
Inflation, 1990-2007	0.0308	0.0234	0.0739***	0.0896***
	(1.393)	(1.190)	(2.867)	(3.057)
GDP Growth Rate, 1990-2007	0.655*	0.452	-0.538	-0.332
	(1.898)	(1.268)	(-1.027)	(-0.735)
Ethnic Fractionalization	6.505*	6.266		
	(1.672)	(1.441)		
Ethnic Fractionalization x Related Lending	-0.186**	-0.171**		
	(-2.509)	(-2.169)		
Rule of Law			3.321***	3.917***
			(3.197)	(3.856)
Constant	99.21***	99.64***	102.3***	100.8***
	(41.59)	(41.43)	(11.72)	(18.96)
Observations	74	67	63	54
R-squared	0.243	0.187	-1.022	-0.533

Table 6. More Controls

T-statistics are in parentheses. *, **, and *** represent statistical significance at the 10%, 5%, and 1% level respectively. All models estimated via ordinary least squares.
Dependent variable is the average growth rate of private credit / GDP from 1990 to 2007, obtained from the World Bank's Financial Structure Database. The related lending index is the average of responses to four questions on related lending drawing on the database of bank regulation and supervision created by Barth, Caprio and Levine (2000, 2003). Rule of law comes from the index developed by Kaufmann, Kraay, and Zoido-Lobaton. Data on stock market capitalization (growth), Bank deposits/GDP Growth and Bank Credit/Bank Deposits Growth are also from the World Bank Financial Structure Database. The Chinn-Ito Index of Capital Market Openness measures a country's degree of capital market openness (Chinn and Ito, 2007).
Government Ownership of Banks is from the database of bank regulation and supervision (Barth, Caprio, Levine). The Corruption index (1998-2007), Property rights index (1995-2007) and Financial freedom index (1995-2007) come from the Index of Economic freedom, created by the Heritage Foundation and the Wall Street Journal.

Dependent variable:										
Private credit/GDP growth, 1990-2007	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Related Lending Index	-0.370***	-0.197**	-0.190**	-0.371***	-0.354***	-0.371***	-0.258***	-0.353***	-0.367***	-0.367***
	(-3.209)	(-2.346)	(-2.293)	(-3.216)	(-3.090)	(-3.298)	(-2.894)	(-3.003)	(-3.114)	(-3.108)
Rule of Law	-1.318	0.177	0.343	-1.240	-1.122	-1.650	-0.461	-2.936	-1.358	-1.475
	(-1.141)	(0.217)	(0.425)	(-1.071)	(-0.997)	(-1.445)	(-0.475)	(-1.665)	(-0.939)	(-1.182)
Related Lending x Rule of Law	0.0678***	0.0394***	0.0378**	0.0678***	0.0655***	0.0668***	0.0493***	0.0641***	0.0670***	0.0667***
	(3.428)	(2.734)	(2.664)	(3.422)	(3.340)	(3.477)	(3.227)	(3.157)	(3.338)	(3.343)
Initial Private Credit/GDP	-9.077***	-9.009***	-8.587***	-9.522***	-10.11***	-7.906***	-8.629***	-9.036***	-8.356***	-8.482***
	(-6.696)	(-6.080)	(-6.149)	(-6.899)	(-6.516)	(-5.724)	(-6.238)	(-6.791)	(-6.326)	(-6.478)
Inflation, 1990-2007	0.0518**	-0.00160	0.0424	0.0502**	0.0529***	0.0515***	0.0387**	0.0552***	0.0558**	0.0573**
	(2.646)	(-0.0475)	(1.246)	(2.489)	(2.715)	(2.657)	(2.307)	(3.048)	(2.491)	(2.576)
GDP Growth Rate, 1990-2007	0.323	0.461*	0.431	0.268	0.219	0.391	0.310	0.367	0.327	0.327
	(1.247)	(1.801)	(1.675)	(1.028)	(0.826)	(1.563)	(1.259)	(1.396)	(1.136)	(1.149)
Stock Market Capitalization Growth, 1990-2007		0.434								
		(1.252)								
Stock Market Capitalization/GDP Growth, 1990-2007			-0.209							
			(-0.509)							

Chinn-Ito Index of Capital Market Openness, 1990-2007				-0.0900						
				(-0.228)						
Bank deposits/GDP Growth, 1990-2007					7.033***					
					(3.145)					
Bank Credit/Bank Deposits Growth, 1990-2007						12.01***				
						(2.887)				
Government Ownership of Banks							0.00671			
							(0.451)			
Corruption Index								1.853		
								(1.266)		
Property Rights Index									-1.95e-05	
									(-0.000359)	
Financial Freedom Index										0.0169
										(0.564)
Constant	112.9***	103.6***	102.5***	112.9***	112.0***	113.9***	107.5***	111.5***	112.6***	112.4***
	(16.58)	(20.58)	(20.53)	(16.83)	(17.27)	(16.78)	(17.86)	(16.28)	(16.19)	(16.21)
Observations	74	58	58	73	74	74	71	74	70	70
R-squared	0.480	0.533	0.530	0.491	0.504	0.516	0.449	0.493	0.479	0.482

Table 7. Other Measure of Financial Development

T-statistics are in parentheses. *, **, and *** represent statistical significance at the 10%, 5%, and 1% level respectively. All models estimated via ordinary least squares.
Dependent variables are stock market capitalization, stock market total value traded, and liquid liabilities, taken from the World Bank's Financial Structure Database. The related lending index is the average of responses to four questions on related lending drawing on the database of bank regulation and supervision created by Barth, Caprio and Levine (2000, 2003). Rule of law comes from the index developed by Kaufmann, Kraay, and Zoido-Lobaton.

	Stock market capitalization/GDP, 1990-2007	Stock market total value traded/GDP, 1990-2007	Liquid liabilities/GDP, 1990-2007
	(1)	(2)	(3)
Related Lending Index	0.0217	0.0858	-0.00252
	(1.000)	(0.620)	(-1.415)
Rule of Law	0.463	0.0661	-0.0341
	(1.201)	(0.0320)	(-1.286)
Related Lending x Rule of Law	-0.00458	-0.0154	0.000413
	(-1.085)	(-0.614)	(1.199)
Initial Private Credit/GDP	0.499	7.978	0.112*
	(1.595)	(1.138)	(1.707)
Inflation, 1990-2007	0.0574***	-0.0117	-0.000244
	(3.174)	(-0.637)	(-1.505)
GDP Growth Rate, 1990-2007	-0.0840	0.269	0.0109
	(-1.104)	(0.460)	(1.660)
Constant	-2.379	-3.039	0.156
	(-1.393)	(-0.301)	(1.120)
Observations	58	57	72
R-squared	0.553	0.148	0.216

Table 8. Split Sample Analysis

T-statistics are in parentheses. *, **, and *** represent statistical significance at the 10%, 5%, and 1% level respectively. All models estimated via ordinary least squares.
Dependent variable is the average growth rate of private credit / GDP from 1990 to 2007, obtained from the World Bank's Financial Structure Database. The related lending index is the average of responses to four questions on related lending drawing on the database of bank regulation and supervision created by Barth, Caprio and Levine (2000, 2003). Rule of law comes from the index developed by Kaufmann, Kraay, and Zoido-Lobaton. The sample is split into three sub-samples based on the Rule of Law index.

Dependent variable:	(1)	(2)	(3)	(4)	(5)	(6)
Private credit/GDP growth, 1990-2007						
	Low-level Rule of Law		Mid-level Rule of Law		High-level Rule of Law	
Related Lending Index	-0.113**	-0.121**	0.00770	0.00752	0.0499**	0.0405*
	(-2.358)	(-2.513)	(0.335)	(0.329)	(2.487)	(1.917)
Rule of Law		-1.326		0.982		3.512*
		(-0.702)		(0.791)		(1.744)
Initial Private Credit/GDP	-13.77**	-13.39**	-10.43***	-10.90***	-7.391***	-7.734***
	(-2.396)	(-2.290)	(-3.656)	(-3.821)	(-3.919)	(-4.675)
Inflation, 1990-2007	0.160	0.171*	0.0318	0.0339	-0.239*	0.0727
	(1.611)	(1.808)	(1.378)	(1.355)	(-1.867)	(0.339)
GDP Growth Rate, 1990-2007	0.541	0.734	0.412	0.350	0.0312	0.134
	(0.762)	(0.907)	(1.057)	(1.013)	(0.0601)	(0.243)
Constant	107.3***	112.6***	105.1***	100.4***	106.7***	83.25***
	(30.28)	(13.95)	(30.60)	(12.10)	(35.17)	(5.914)
Observations	25	25	24	24	25	25
R-squared	0.438	0.447	0.437	0.443	0.429	0.525

Table 9. Control for Financial Crisis

T-statistics are in parentheses. *, **, and *** represent statistical significance at the 10%, 5%, and 1% level respectively. All models estimated via ordinary least squares.
Dependent variable is the average growth rate of private credit / GDP from 1990 to 2007, obtained from the World Bank's Financial Structure Database. The related lending index is the average of responses to four questions on related lending drawing on the database of bank regulation and supervision created by Barth, Caprio and Levine (2000, 2003). Rule of law comes from the index developed by Kaufmann, Kraay, and Zoido-Lobaton. The dummy variable for financial crisis comes from Caprio and Klingebiel (2003).

	(1)	(2)
VARIABLES		
Related Lending Index	-0.378***	-0.352***
	(-3.294)	(-3.188)
Rule of Law	-1.492	-0.762
	(-1.321)	(-0.630)
Related Lending x Rule of Law	0.0684***	0.0633***
	(3.467)	(3.352)
Initial Private Credit/GDP	-8.840***	-9.045***
	(-6.722)	(-7.028)
Inflation	0.0556***	0.0575***
	(3.167)	(3.135)
GDP Growth Rate	0.300	0.297
	(1.115)	(1.100)
Financial Crisis	-0.673	4.293
	(-0.856)	(0.925)
Financial Crisis x Rule of Law		-0.987
		(-1.226)
Constant	114.2***	110.4***
	(16.77)	(15.06)
Observations	74	74
R-squared	0.485	0.495

Robust t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 10. Analysis of Post-Crisis (1998-2007) Data

T-statistics are in parentheses. *, **, and *** represent statistical significance at the 10%, 5%, and 1% level respectively. All models estimated via ordinary least squares.
Dependent variable is the average growth rate of private credit / GDP from 1998 to 2007, obtained from the World Bank's Financial Structure Database. The related lending index is the average of responses to four questions on related lending in 1998 drawing on the database of bank regulation and supervision created by Barth, Caprio and Levine (2000). Rule of law comes from the index developed by Kaufmann, Kraay, and Zoido-Lobaton. Strong Rule of Law is a dummy equal to one if Rule of Law is above the 66th percentile. In columns 4 to 9 the sample is split into three sub-samples based on the Rule of Law index in 1998.

Dependent variable: Private credit/GDP growth, 1998-2007	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
				Low-level Rule of Law		Mid-level Rule of Law		High-level Rule of Law	
Related lending index, 2000	0.0326	-0.148	-0.0157	-0.0259	-0.0271	0.0325	0.0319	0.0778**	0.0645**
	(1.485)	(-0.785)	(-0.434)	(-0.270)	(-0.258)	(0.915)	(0.880)	(2.383)	(2.095)
Rule of Law, 1998	4.199***	1.876			0.640		2.640		3.494
	(4.277)	(0.885)			(0.139)		(0.803)		(1.592)
Related lending (2000) x Rule of law (1998)		0.0323							
		(1.017)							
Strong Rule of Law (Above 66th percentile, 1998)			2.603						
			(1.040)						
Strong Rule of Law (1998) x Related lending index (2000)			0.0878*						
			(1.826)						
Private credit by deposit money banks / GDP, 1998	-9.213***	-9.412***	-8.462***	-10.89	-11.68	-7.713***	-8.092***	-9.959**	-9.275**
	(-5.377)	(-5.440)	(-4.979)	(-1.629)	(-1.656)	(-3.562)	(-3.955)	(-2.507)	(-2.312)
Inflation, 1998-2007	0.0484	0.0318	0.0668	0.204	0.195	-0.00931	0.0143	0.375	0.674
	(0.619)	(0.436)	(0.837)	(1.040)	(1.092)	(-0.178)	(0.212)	(0.494)	(0.853)
GDP growth, 1998-2007	0.248	0.224	0.613	0.348	0.333	0.399	0.363	-0.101	0.290
	(0.611)	(0.574)	(1.467)	(0.584)	(0.567)	(0.540)	(0.497)	(-0.0938)	(0.282)
Constant	83.06***	96.31***	103.5***	103.5***	101.2***	103.2***	89.75***	108.7***	84.49***
	(15.52)	(7.635)	(30.55)	(16.06)	(6.213)	(20.23)	(4.730)	(12.12)	(4.797)
Observations	74	74	74	24	24	24	24	26	26
R-squared	0.406	0.417	0.376	0.172	0.174	0.466	0.485	0.526	0.567

Appendix 1: Effects of Related Lending Conditional on Rule of Law and Effects of Rule of Law Conditional on Related Lending

This table tabulates the effects of related lending on banking development (i.e. growth in the ratio of credit to the private sector relative to GDP) at varying levels of rule of law (panel A) and the effects of rule of law at varying levels of related lending (panel B) based on specification 3 of Table 3.

Panel A

Rule of Law	Effects of Related Lending
4.45 (25th percentile)	-0.06829
5.05 (50th percentile)	-0.02761
6.16 (75th percentile)	0.047648

Panel B

Related Lending	Effects of Rule of Law
47.25 (25th percentile)	1.88555
74.25 (50th percentile)	3.71615
83 (75th percentile)	4.3094

Appendix 2: Index of Official Supervisory Powers

The questions that are used to calculate the index of official supervisory powers are:

1. Does the supervisory agency have the right to meet with external auditors to discuss their report without the approval of the bank?
2. Are auditors required by law to communicate directly to the supervisory agency any presumed involvement of bank directors or senior managers in elicit activities, fraud or insider abuse?
3. Can supervisors take legal action against external auditors for negligence?
4. Can the supervisory authority force a bank to change its internal organizational structure?
5. Are off-balance sheet items disclosed to supervisors?
6. Can the supervisory agency order the bank's directors or management to constitute provisions to cover actual or potential losses?
7. Can the supervisory agency suspend the directors' decision to distribute dividends?
8. Can the supervisory agency suspend the directors' decision to distribute bonuses?
9. Can the supervisory agency suspend the directors' decision to distribute management fees?
10. Who can legally declare – such that this declaration supersedes the rights of shareholders – that a bank is insolvent? A) Bank supervisor; B) Court; C) Deposit insurance agency; D) Bank restructuring or asset management agency; E) Other.
11. According to the Banking Law, who has authority to intervene – that is, suspend some or all ownership rights – a problem bank? A) Bank supervisor; B) Court; C) Deposit insurance agency; D) Bank restructuring or asset management agency; E) Other.
12. Regarding bank restructuring and reorganization, can the supervisory agency or any other government agency supersede shareholder rights or remove and replace management or directors? A) Bank supervisor; B) Court; C) Deposit insurance agency; D) Bank restructuring or asset management agency; E) Other.

For questions 1-9: Yes=1: No=0.

For questions 10-12: Bank supervisor=1: Deposit insurance agency=0.5; Bank restructuring or asset management agency=0; 0 otherwise.

The official supervisory powers index is constructed as the sum of these assigned values, with higher values indicating greater power.

Source: Barth, Caprio, and Levine (2006).